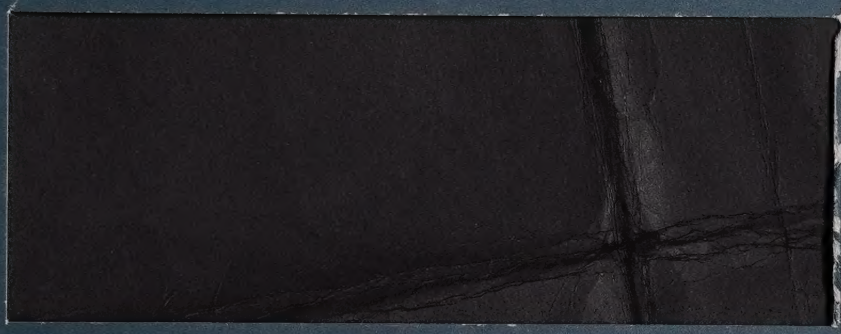

CAL LAB
HARRIS TECHNICAL SERVICES
3888 Calle Fortunada, Bldg. A
San Diego, CA 92123

OPTICS TECHNOLOGY INC
901 California Avenue ▪ Palo Alto, California 94304 ▪ (415) 327-6600

MODEL 195

CW GAS LASER

INSTRUCTION MANUAL

INSTRUCTIONS FOR OPERATING AND SERVICING

Issue 2
July 1968

Instrument Serial Numbers

Tube 337 & 346

Power Supply _____

MODEL 195 CW GAS LASER

CAUTION:

Voltages present in both the laser head and power supply of this instrument are sufficiently high to be considered dangerous to human life.

Laser radiation, whether visible or invisible, can be damaging to the human eye. Therefore, it is not to be viewed directly or indirectly without proper filtering.

Instruments with mirror coatings selected at 1.15 and 3.39 microns produce radiation invisible to the human eye. Extreme caution must be exercised. Appropriate detectors should be used to measure these IR laser outputs.

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OPERATING INSTRUCTIONS

MODEL 195 CW GAS LASER

Unpacking

Carefully unpack the laser instrument and check for any obvious shipment damage.

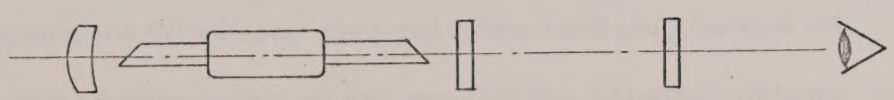
Operation

To connect the Model 195 laser head to the power supply, plug the Winchester connector into the socket at the rear of the power supply chassis. Connect the power supply to a 117 VAC, 50 - 60 Hz source, turn the switch on, wait 5 seconds and push the red button, which initiates a starting pulse. The laser should now be operating. Occasionally, due to rough handling in shipment, the laser interferometer (and mirrors) will become slightly or completely detuned. If the laser is slightly detuned (i.e., low in output power) but is still lasing, an interferometer mirror adjustment is needed.

Laser Alignment

To accomplish this, the laser head must be firmly mounted on an optical bench or "V" block and the output power monitored with a suitable power meter (such as OTI Model 610 or 615). Turn on the laser as previously described and read the output power. If less than 2 mw TEM_{00} adjust the interferometer in the following way. At each end of the laser head, there are three allen head screws that are used to adjust the interferometer mirrors. Adjust these screws one at a time, starting with the mirror at the end of the tube with the three countersunk holes (i.e., the output end) until the output power is maximized.

If there is no lasing action when received, but the plasma tube is operating (observe plasma discharge through window with the eye off axis to the plasma tube), the interferometer is completely out of alignment. To realign the instrument, tape ~~the~~ a #5 filter, ~~supplied with the instrument~~, over the flat mirror (non-output end mirror). Then look down the bore of the laser through the filter and flat mirror toward the inside radius of the output mirror.



Output mirror Flat mirror Filter

You will notice a rather small yellow-red spot on the output mirror. This spot probably is not concentric with the bore of the plasma tube. To obtain lasing action, the spot must be brought to the center of the bore. Adjust the output mirror while looking down the bore until the condition is corrected. Use the same procedure to align the flat mirror. When you are adjusting the mirror while looking down the bore, you will see it commence lasing. The filter provided with the instrument that you are viewing through will sufficiently attenuate the energy entering the eye well below the energy threshold where any damage could occur.

With the laser operating at 2 mw's, the energy through the flat mirror and filter is less than 5 micro-watts. With the laser operating at 2 mw, the energy through the output mirror and filter is less than 20 micro-watts.

After the lasing action is restored, peak the output power in the manner previously described.

Power Supply

If the power supply is connected to a line voltage that is too low, it may be necessary to push the start button several times to achieve proper excitation of the plasma tube.

The plasma tube used in this laser is a coaxial type with dual anodes and a common cathode. Therefore, it is possible (under low line voltages conditions) that only one end of the plasma tube will ignite, resulting in a very low output power. Pressing the start button several times will usually start both ends of the plasma tube even with low line voltage.

The power supply is a well-filtered full wave voltage doubler type producing approximately 1600 VDC open circuit at 14 ma. For safety reasons the supply will not operate without the Winchester plug connected.

Be sure to check the power supply fuse if the plasma tube fails to ignite. If the start button has been depressed several times and the plasma tube fails to start check the following:

1. Make sure that the AC line voltage is at least 110 VAC.

2. Unplug the power supply line and disconnect the laser head by removing the Winchester plug. Allow a minimum of two minutes for the doubler capacitors to discharge.

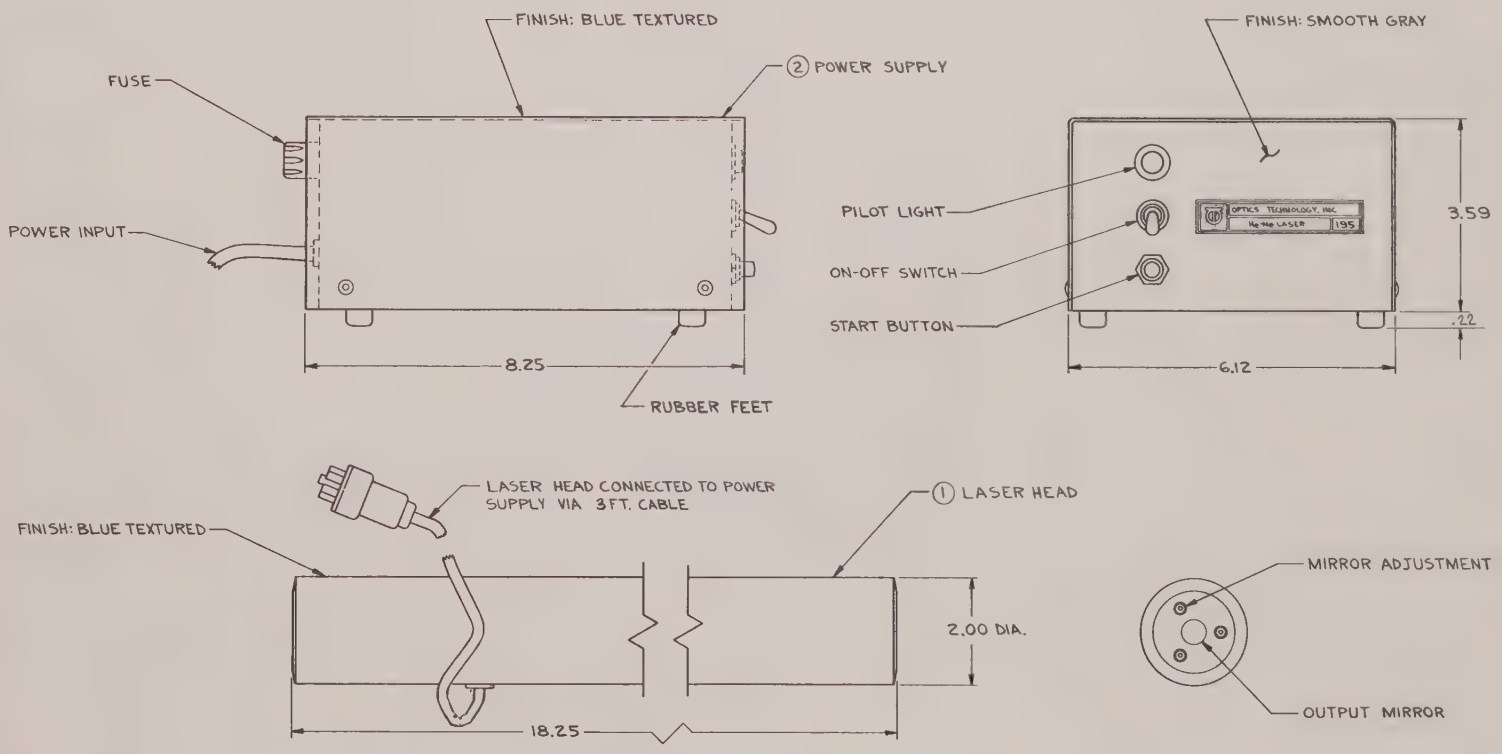
3. Remove the four screws that secure the P.S. cover and remove the cover.

4. Replace the Winchester plug and power cord plug (switch off).

5. Turn the power switch on and measure the following voltages: Point A/E at resistor connection and chassis ground, approx. 1500 - 1600 VDC. Point B at resistor slider and ground, 6 - 12 VAC. Voltages less than stated indicate a faulty power supply. Do not depress the start button during these measurements.

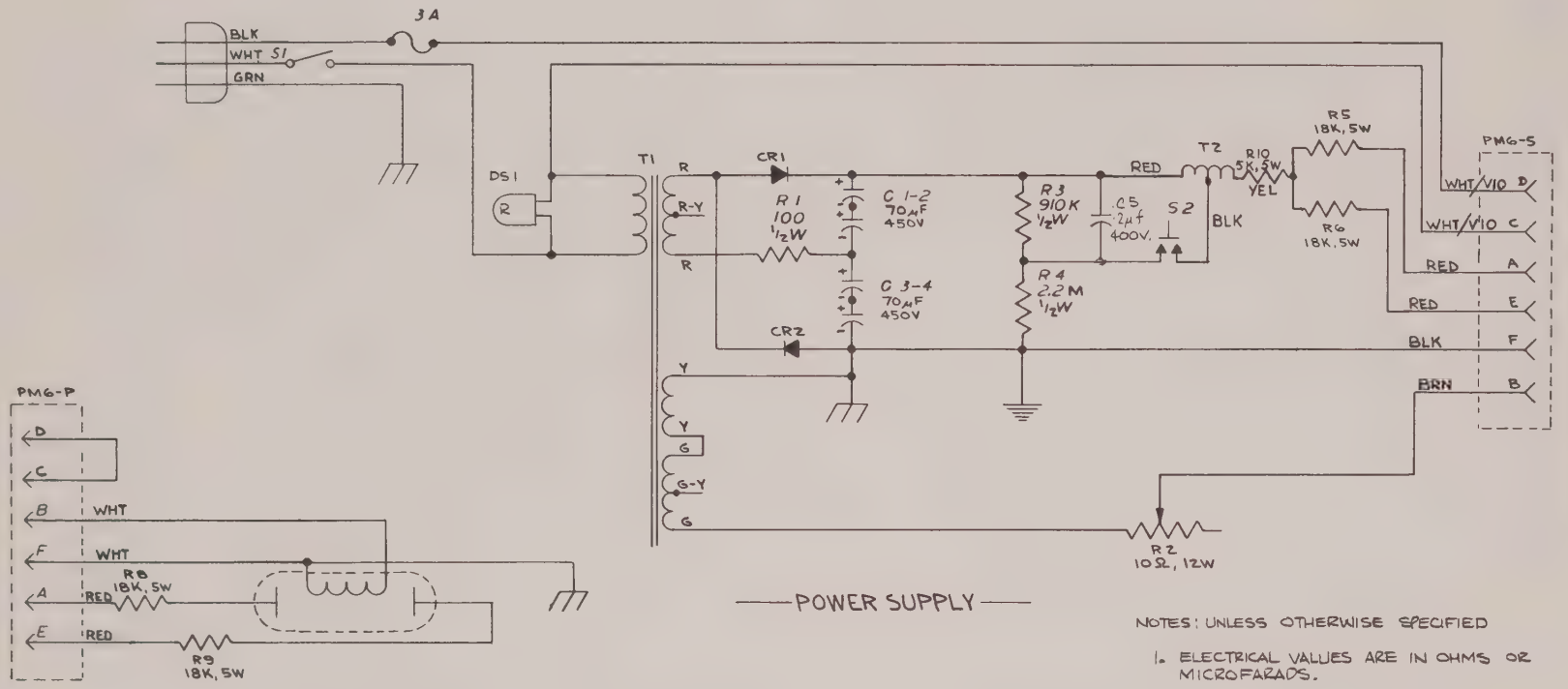
6. The high voltage starter pulse initiated by depressing the start button can only be measured with a high voltage probe and oscilloscope. This voltage is approx. 12 - 16 KVP.

If the instrument is inoperative due to causes other than those described, please contact your nearest representative or the factory directly for appropriate repair action.



TOLERANCES UNLESS OTHERWISE NOTED	OPTICS TECHNOLOGY, INC
DECIMAL ±	SCALE FULL
FRACTIONAL ±	TITLE MODEL 195 HeNe LASER
ANGULAR ±	DATE 9 APR 68 — DRAWING NUMBER 195-130 — REV. A

REVISION RECORD				
	A	ADD 5K & 5W RESISTOR - R10		
	B	CHANGED DWG PER ECN		



NOTES: UNLESS OTHERWISE SPECIFIED

1. ELECTRICAL VALUES ARE IN OHMS OR MICROFARADS.
2. RESISTORS ARE ±5%, ½ WATT.
3. FOR LASER HEAD ASSY SEE DWG 195-115. FOR POWER SUPPLY ASSY SEE DWG 195-127.

OPTICS TECHNOLOGY, INC

SCALE:	APPROVED BY:	DRAWN BY DAK
DATE: 2 APR 68		REVISED

SCHEMATIC-POWER SUPPLY & LASER HEAD
(MOD. 195 LASER)

DRAWING NUMBER 195-111 REV 8

OPTICS TECHNOLOGY INC
901 California Avenue ■ Palo Alto, California 94304

WARRANTY

Instruments sold by Optics Technology, Inc. (hereinafter called "the Company") are warranted only as stated below:

Subject to the exceptions and upon the conditions specified below, the Company agrees to correct, either by repair, or by its electron by replacement, free of charge F.O.B. Palo Alto, California, any defect of material or workmanship which develops within one year from the date of delivery to the customer but in no event more than fifteen (15) months after delivery to distributor, whichever is earlier. The buyer must notify the Company of any defect immediately after discovery, and must give satisfactory proof of defect or, upon request, return the defective item to the Company in Palo Alto, California, at his expense for examination.

In addition to such notification and proof, the exceptions and conditions mentioned above are the following:

(a) If any component or accessory incorporated in or used in connection with products manufactured by the Company, such as batteries, vacuum tubes, plasma tubes, detectors, optical coatings, lamps, laser rods and Q-switching elements, or any other expendable material, fails to give reasonable service for a reasonable period of time, the Company will, at its election, replace or repair such component or accessory. What constitutes reasonable service and what constitutes a reasonable period of time shall be determined solely by the Company in its absolute discretion after the Company is in possession of all the facts concerning operating conditions and other pertinent factors and after such component or accessory has been returned to the Company, transportation prepaid.

(b) The Company makes no warranty concerning components or accessories not manufactured by it. However, in the event of the failure of any components or accessory not manufactured by the Company, the Company will give reasonable assistance to the buyer in seeking an adjustment from the manufacturer of the item in question based on the manufacturer's own warranty, if any.

(c) The company shall be released from all obligations under its warranty in the event its products or parts have been subject to accident, alteration, abuse or misuse, or which have not been operated and maintained in a normal manner.

(over)

(d) Except as stated above, the Company makes no warranty, expressed or implied (either in fact or by operation of law), statutory or otherwise, all warranties not expressly stated herein being expressly waived by the buyer, and except to the extent stated above, the Company shall have no liability under any warranty, expressed or implied (either in fact or by operation of law), statutory or otherwise.

(e) The Company expressly disclaims any liability to its customers, dealers, distributors and representatives, and to users of its products and to any other person or persons for special or consequential damages of any kind and from any cause whatsoever, arising out of or in any way connected with the manufacture, sale, handling, repair, maintenance or replacement of or arising out of or in any way connected with the use of said products.

(f) Representations and warranties made by any person, including dealers, distributors and representatives of the Company, which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of the Company as set forth above), shall not be binding upon the Company unless reduced to writing and approved by an Officer of the Company.

(g) This warranty shall be construed in accordance with and governed by the laws of the State of California.

If any fault develops, the following steps should be taken:

1. Notify us, giving full details of the difficulty, and include the model number and serial number. On receipt of this information, we will give you service data or shipping instructions.

2. On receipt of shipping instructions, forward the instrument prepaid to the factory or to the authorized repair station indicated on the instructions. If requested, an estimate of the charges will be made before the work begins provided the instrument is not covered by the warranty.

CLAIM FOR DAMAGE IN SHIPMENT

The instrument should be tested as soon as it is received. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. Include model number and serial number when referring to this instrument for any reason.

SHIPPING INSTRUCTIONS

All shipments of Optics Technology instruments should be made via truck or Railway Express. The instruments should be packed in a strong exterior container and surrounded by two or three inches of excelsior or similar shock-absorbing material.